

Superior

A Compact Floor Standing
Gas Fired, High Efficiency
Condensing Hot Water Boiler

Outputs 120, 160, 200, 240, 280 kW



ORMANDY

Hartley & Sugden

STEAM & HOT WATER BOILERS

The Superior is a, pre-assembled floor standing, gas fired high efficiency condensing boiler. It is a compact design with a small footprint lending itself to both single and multiple boiler installations.

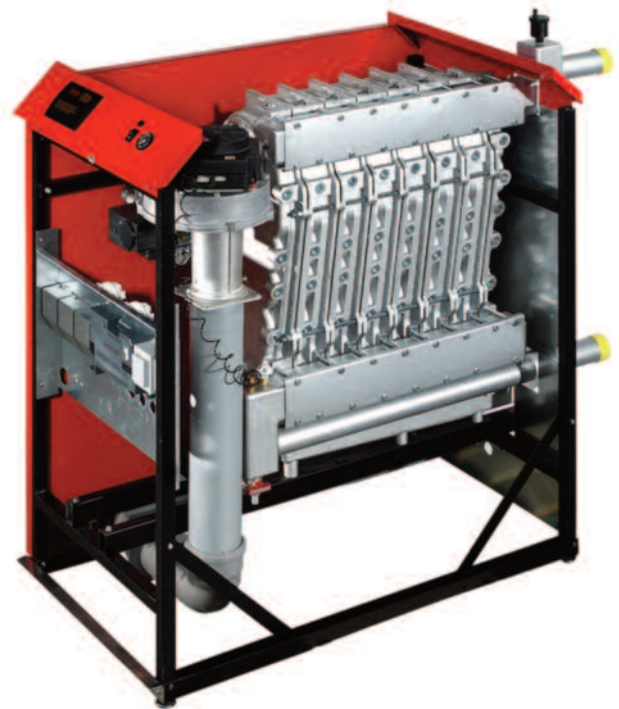
Superior Boiler Features



- Latest technology heat exchanger and combustion system
- Robust high quality and reliable heat exchanger
- 5 year warranty on heat exchanger
- User friendly controls
- Compact with small footprint
- Single and multiple boiler installations
- Supplied fully assembled and tested
- Single Aluminium/Silicon heat exchanger
- Natural gas and Propane Models
- Room sealed and conventional open flue applications
- Easy to install and maintain
- High specification controls
- Systems control options
- Local and remote signalling and diagnostics

Superior Boiler Performance

- Heat outputs from 120 to 280 kW
- High efficiency condensing operation up to 107.5%
- Very low NOX emissions at <35mg/kWh
- Very low CO emissions
- Wide modulation range from 20%to100%
- Low noise at less than 50dBA



Boiler Description

The Superior boiler is high efficiency up to 107.5% (net CV). NOX emission levels in the lowest category of class 5 at less than 35mg/kWh.

Fully modulating air gas ratio control maintaining optimum combustion conditions giving highest efficiencies and lowest emissions over a wide modulation range of boiler outputs from 20 to 100% (5:1 modulating range).

The integral cast Aluminium/Silicon sectional heat-exchanger has a water enclosed combustion chamber and is contained within a durable and robust painted steel casing which is easily removable for ease of maintenance.

There is a user interface control panel mounted on top of the boiler and the boiler controller and electrical connections can all be accessed from the front of the boiler by removal of the front panel.

The boiler water flow and return connections, flue and combustion air connections and the condensate drain connection are all located at the rear of the boiler.

The boiler is virtually silent in operation due to its enclosed combustion chamber and air intake silencer system.

The boiler is suitable for open flue or room sealed applications and has been designed for both central heating (CH) and domestic hot water (DHW)

indirect, fully pumped and pressurised hot water systems.

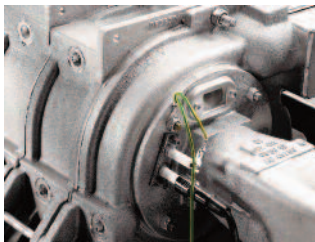
It has a single down firing pre mix burner which can operate on Natural gas or Propane and has a fan powered combustion system giving very low Nox and CO emissions.

To ensure the highest quality standards every Superior boiler is checked and tested after final assembly in the factory.

The Superior boiler should be installed in accordance with BS 6644 and other relevant standards, codes of practice and current building regulations.



Heat exchanger element



Burner mounting to combustion chamber



Heat exchanger and pre mix burner

Controls

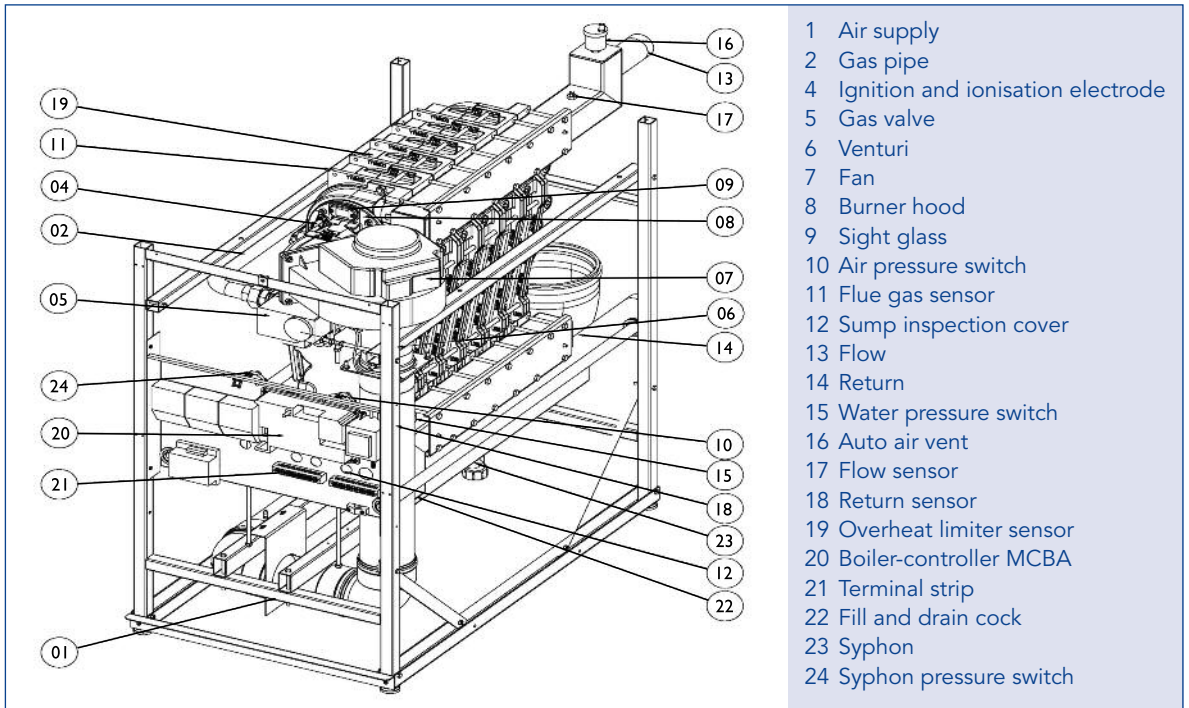
The Superior boiler is controlled and monitored by the built in electronic microprocessor control system which provides all water temperature/flow and combustion safety features and boiler control to modulate the heat output to meet and match the system load heating and hot water demands. By measurement of the water temperature the control incorporates low water flow rate and frost protection features.

The Superior boiler control has the following features and functions:

- Ignition and safety control
- Fan Control (air and gas ratio combustion control)
- Boiler temperature control
- High temperature protection of the heat exchanger
- Central Heating (CH) pump control
- Domestic Hot Water (DHW) control
- Built in frost protection
- Boiler status giving fault indication fault logging and diagnostics
- Computer connection for local and remote access

Optional system controls can be supplied to operate in conjunction with the boiler controller to provide weather compensation, optimisation and cascade control for multiple boiler applications.

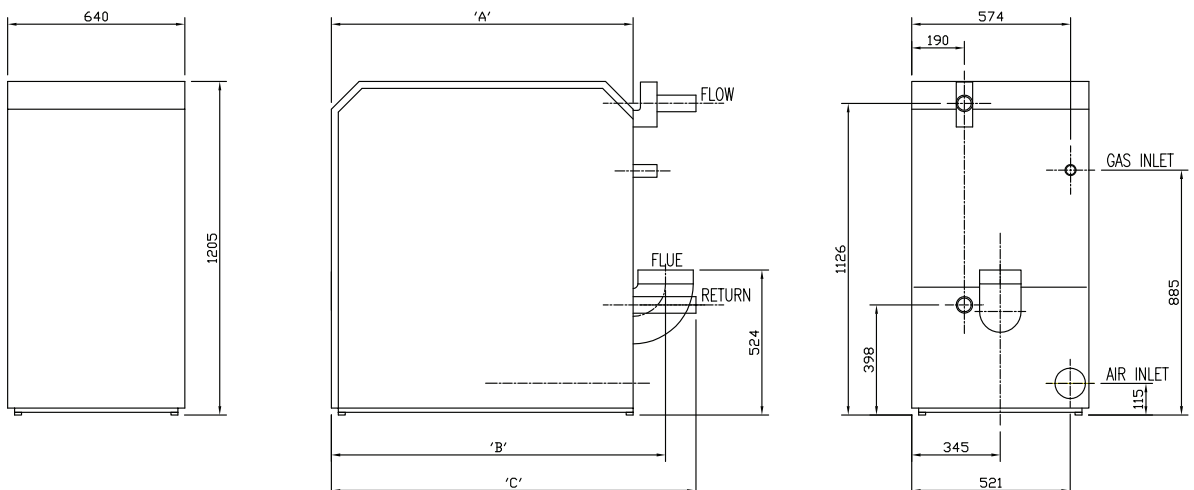
Boiler Construction



Installation Clearances

Consideration must be given for access for flue installation and access at the rear of the boiler. Recommended clearances are as follows.

- Rear** - 500mm
- Front** - length of the boiler
- Top** - 500mm
- Sides** - 500mm (for multiple boiler applications 50mm gap between boilers is acceptable)



Technical Data and Dimensions

Superior Model	120	160	200	240	280
General					
Number of sections	4	5	6	7	8
Nominal Output @ 80-60°C (kW) min/max	21.3/112.9	26.2/155.8	43.1/196.8	47/236.2	51/275.5
Nominal Output @ 50-30°C (kW) min/max	23.7/119.1	29/164.5	47.3/207.8	51.6/249.4	55.9/290.9
Nominal Input Net CV min/max (kW)	22/115.9	27/160	44/200	48/240	52/280
Efficiency based on net CV					
Efficiency @ 80-60°C (%) min/max	97/97.4	97/97.4	98/98.4	98/98.4	98/98.4
Efficiency @ 50-30°C (%) min/max	107.5/102.8	107.5/102.8	107.5/103.9	107.5/103.9	107.5/103.9
Combustion and flue system					
Maximum gas flowrate G20 (m ³)	12.1	16.1	20.1	24.2	28.2
Gas connection size (male thread)	1"	1"	1"	1"	1"
Gas inlet pressure G20 (mbar)	20	20	20	20	20
Maximum Flue gas volume (m ³ /min)	3.5	4.2	4.8	5.5	5.9
Flue gas temp at max output and 80-60°C (°C)	70	70	70	70	70
NOX (mg/kWh)	< 26.4	< 35	< 26.4	< 26.4	< 26.4
CO (ppm)	< 35	< 35	< 35	< 35	< 35
CO2 content G20 (%) min/max	9.1/9.3	9.1/9.3	9.1/9.3	9.1/9.3	9.1/9.3
Flue gas connection size (mm)	150	150	200	200	200
Overpressure available at flue outlet (Pa)	100	150	150	150	150
Air inlet size (room sealed applications) (mm)	110	110	110	110	110
Water system					
Maximum water flow temperature (°C)	90	90	90	90	90
Water pressure min/max (bar)	0.8/6	0.8/6	0.8/6	0.8/6	0.8/6
Water content (l)	15.3	18	22.9	25.6	28.4
Max water flow rate at maximum output and 20k (m ³ /h)	10.3	13.6	16.4	19.1	21.8
Water resistance at maximum output and 20k (mbar)	80	80	90	90	100
Maximum differential @ max output/min output (k)	25/35	25/35	25/35	25/35	25/35
Flow and Return connection size (male thread)	2"	2"	2"	2"	2"
Condensate connection size	¾"	¾"	¾"	¾"	¾"
Electrics					
Insulation IP	20	20	20	20	20
Supply	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Fuse rating	6.3AT	6.3AT	6.3AT	6.3AT	6.3AT
Maximum power consumption (W)	260	320	320	320	320
Weight and Dimensions					
Dry Weight (kg)	160	180	210	227	245
Length over casing A (mm)	850	850	1090	1090	1090
Length to flow and return C (mm)	1007	1007	1317	1317	1317
Length to centre line of flue B (mm)	942	942	1207	1207	1207
Height (mm)	1205	1205	1205	1205	1205
Width (mm)	640	640	640	640	640

Typical Installation Examples of Hydraulic Connections

The following typical schematic layouts are shown as examples only. The actual system design must be made in accordance with the application heating and hot water requirements. Reference should be made to BS6644 and CIBSE Guide for Non Domestic Hot Water Systems AM14:2010.

To ensure adequate water flow through the boiler the schematics show the recommended use of low loss mixing headers. These are not necessary if the pumps are sized and the system designed so as to guarantee at least the minimum water flow rate through the boiler and to ensure that the maximum water flow rate through the boiler is not exceeded.

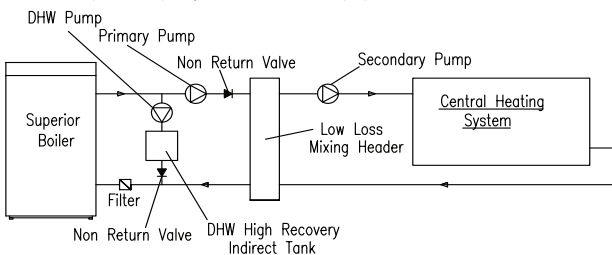
As a modulating condensing boiler the Superior is at its most

efficient and economic at as low as possible return temperatures and its performance is further enhanced under part load operating conditions.

Low loss mixing headers give installation flexibility for both new systems and replacement of existing boiler applications so as to achieve the best operating conditions and therefore maximise the benefits of the Superior boiler. In all cases system design operating temperatures and emitters sizing should be chosen to optimise the performance of the Superior boiler. System controls and variable temperature circuits should be employed and in the case of boiler replacement alternatives considered for high temperature constant temperature circuits if relevant.

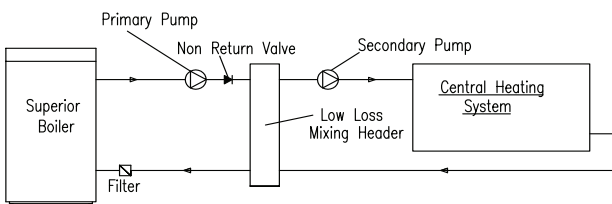
Schematic 1

Superior Boiler hydraulic diagram for Domestic Hot Water (DHW) & one central heating (CH) zone
(Boiler output greater than DHW output)



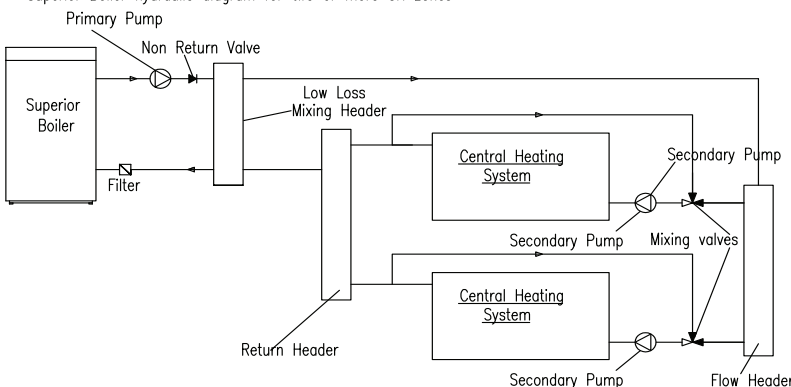
Schematic 2

Superior Boiler hydraulic diagram for one CH Zone



Schematic 3

Superior Boiler hydraulic diagram for two or more CH zones



Water quality and treatment

To avoid the risk of contamination and system debris settling within the boiler heat exchanger and in accordance with good practice thorough flushing of the system should be undertaken before installation and commissioning. Furthermore it is recommended that a filter is fitted to protect the boiler from system contamination.

When installing the boiler on an old existing system consideration should be given to the installation of a plate heat exchanger to give separation of the boiler from the system water.

Suitable plate heat exchangers are available on request from Rycroft as part of the Ormandy Group.

System water treatment is essential and must be suitable for aluminium boilers. A water treatment specialist should be consulted for advice.

Condensate Drain

The installation must provide for the discharge of the condensate water from the boiler syphon to the external drain system. Connection is made from the boiler syphon via the flexible plastic tube provided at the rear of the boiler.

Typical Flue and Air Connections

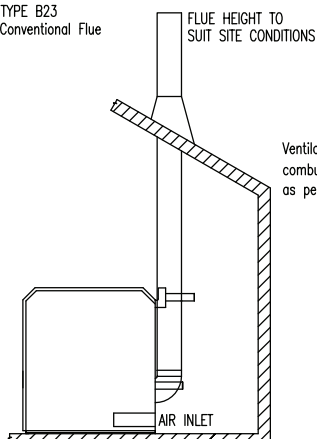
The Superior boiler is suitable for flue types B23, B33, C13, C33, C43, C53, C63, C83.

Flue gas temperatures are very low and water laden so a vapour plume may be visible and the position of the flue terminal should take this into consideration. For this reason it is preferable to terminate the flue vertically.

Most common examples are shown below. Actual flue design will depend on the application and flue calculations should be undertaken to ensure the safe and efficient operation of the boiler. Flue design must be in accordance with BS 6644, IGE UP/10 and Building Regulations as appropriate.

Schematic 1

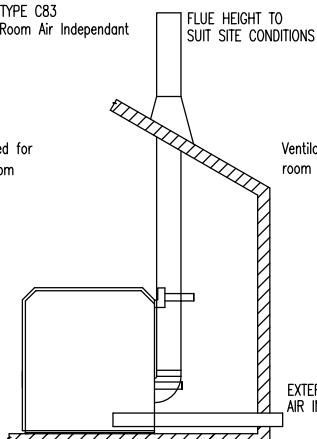
TYPE B23
Conventional Flue



Ventilation provision needed for combustion and boiler room as per BS 6644

Schematic 2

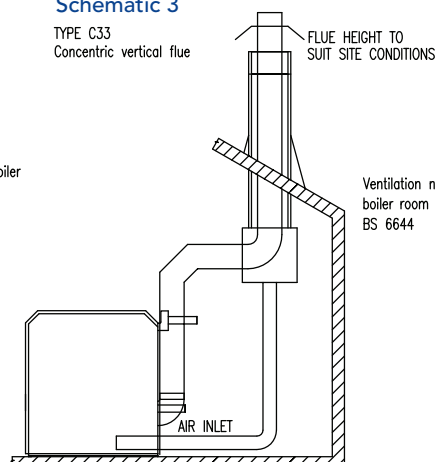
TYPE C83
Room Air Independent



Ventilation needed for boiler room only as BS 6644

Schematic 3

TYPE C33
Concentric vertical flue



Ventilation needed for boiler room only as BS 6644

As there is positive pressure in the flue and the flue gases are moisture laden the flue system should be leak free and free draining with suitably positioned condensate drain points provided to prevent condensate from running back into the boiler.

Combustion air from outside the building improves building air tightness as it reduces the boiler-room fresh air ventilation requirements.

In all cases the air entry and flue outlet points should be in the same pressure zone and free from external influences from surrounding buildings etc.

In all installations it is advisable to fit a terminal guard on the flue outlet and a guard on the combustion air entry to prevent the ingress of dust and debris into the boiler.

There is overpressure from the boiler fan available to overcome flue outlet and combustion air supply duct resistance. To help

system design calculations the table below gives maximum combined lengths of air supply and flue outlet ducts.

For bends in the flue/air ducts design a 45 degree equals 1m and a 90 degree equals 2m reduction in equivalent length of straight duct.

Diameter or equivalent area of flue and air ducts must not be less than boiler connections diameter/area.

If the pressure drop of the combined flue and air duct is greater than the maximum allowed then the input and output of the boiler will be reduced.

For multiple boiler applications wherever possible it is recommended to use individual flue and air ducts per boiler. However if a common flue and air duct system is used it must be purpose designed and special care must be taken to ensure that the reverse circulation and back flow of flue gases through non operating boilers is prevented.

Superior boiler type	max. allowed pressure drop (Pa)	Combined length (m) with Air/flue Duct dia. \varnothing 150mm / \varnothing 150mm	Combined length (m) with Air/flue Duct dia. \varnothing 180mm / \varnothing 180mm	Combined length (m) with Air/flue Duct dia. \varnothing 200mm / \varnothing 200mm
120	100	50	115	
160	150	27	112	
200	150		75	120
240	150		45	82
280	150		33	60



External connections are:

- Room thermostat
- Weather compensation
- 0-10 volt signal for multiple boilers in cascade
- Opentherm optimiser system compatibility

Electrical Connections and Controls

Control panel

The control panel features include an on/off switch, thermometer and the MCBA 5407 electronic microprocessor controller.

The boiler controller is an integrated control system which manages the boiler functions and provides the boiler/system interface. It has boiler status display, computer connection and programming and commissioning parameters. It allows external connection of the system controls to ensure heat output from the boiler modulates to meet and match the application load requirements. CH and DHW pump connections are provided and when fitted DHW has priority.

The controller has an internal heat slope facility which is preset but can be adjusted at the time of boiler commissioning to suit the requirements of the application.

Control Options

Optional weather compensation, cascade controls and Opentherm optimiser controls packages for external mounting to suit the Superior boiler are available on request

Power supply

The boiler is suitable for connection to a 230 volt 1phase 50Hz supply and must be in accordance with IEE regulations.

Commissioning

The boiler must be commissioned by suitably qualified persons.

Ormandy Group Associated Products

The Ormandy group has an extensive range of boilerhouse products, which compliment the Ormandy Hartley & Sugden boiler range. All Ormandy products can be skid mounted to specific requirements. Detailed information on all Ormandy products is available on request.

Additional products include:

- Pressurisation units
- Storage and Non Storage Calorifiers
- Plate heat exchangers
- Package plant rooms which can be designed to incorporate any of the above equipment



Please visit www.ormandytld.com to access comprehensive information on Ormandy Hartley & Sugden products and services.

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Ormandy Hartley & Sugden, Atlas Works, Gibbet Street, Halifax, HX1 4DB England

Tel +44 (0)1422 355651 Email sales@hartleyandsugden.co.uk